

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

LISTING OF CLAIMS

--1. (Currently Amended) A data modulation method comprising the steps of:

encoding transmission data ~~in~~ into a data symbol;

inserting into said data symbol a reference symbol in which multiple synchronizing patterns are aligned in a time series in order to contain a structure of

IA-A-IA-A-A-IA-A-IA-IA

(where: A is a synchronizing pattern and IA is a phase-shifted synchronizing pattern obtained by phase shifting A) ~~into said data symbol~~, said reference symbol producing a ~~two-peak~~ waveform output having only two peaks when said reference symbol is input to a correlator of a receiver, thereby producing a distinguishable waveform pattern from other waveform patterns produced by other communication systems; and

modulating the data symbol in which said reference symbol is inserted with radio frequency signals.

--2. (Previously Presented) The data modulation method according to claim 1, wherein said step of modulating the data symbol comprises conducting the modulation according to an

orthogonal frequency division multiplexing (OFDM) system.

--3. (Currently Amended) A data modulation method comprising the steps of:

encoding transmission data ~~in~~ into a data symbol;

inserting into said data symbol a reference symbol in which multiple synchronizing patterns are aligned in a time series to contain a structure of

A-IA-A-IA-IA-A-IA-A-A

(where: A is a synchronizing pattern and IA is a phase-shifted synchronizing pattern obtained by phase shifting A) ~~into said data symbol~~, said reference symbol producing a ~~two-peak~~ waveform output having only two peaks when said reference symbol is input to a correlator of a receiver, thereby producing a distinguishable waveform pattern from other waveform patterns produced by other communication systems; and

modulating the data symbol in which said reference symbol is inserted with radio frequency signals.

--4. (Previously Presented) The data modulation method according to claim 3, wherein said step of modulating the data symbol comprises conducting the modulation according to an orthogonal frequency division multiplexing (OFDM) system.

--5. (Currently Amended) A data modulation method comprising

the steps of:

encoding transmission data ~~in~~ into a data symbol;

inserting into said data symbol a reference symbol in which multiple synchronizing patterns are aligned in a time series in order to contain a structure of

IB-IB-IB-IB-B-B-B-B-IB

(where: B is a synchronizing pattern and IB is a phase-shifted synchronizing pattern obtained by phase shifting B) into said data symbol, said reference symbol producing a ~~two-peak~~ waveform output having only two peaks when said reference symbol is input to a correlator of a receiver, thereby producing a distinguishable waveform pattern from other waveform patterns produced by other communication systems; and

modulating the data symbol in which said reference symbol is inserted with radio frequency signals.

--6. (Previously Presently) The data modulation method according to claim 5, wherein said step of modulating the data symbol comprises conducting the modulation according to an orthogonal frequency division multiplexing (OFDM) system.

--7. (Currently Amended) A data modulation method comprising the steps of:

encoding transmission data in a data symbol;

inserting into said data symbol a reference symbol ~~in~~ into

which multiple

synchronizing patterns are aligned in a time series in order to contain a structure of

B-B-B-B-IB-IB-IB-IB-B

(where: B is a synchronizing pattern and IB is a phase-shifted
~~syne~~ synchronizing pattern obtained by phase shifting B) ~~into~~
~~said data symbol~~, said reference symbol producing a ~~two-peak~~
waveform output having only two peaks when said reference symbol is
input to a correlator of a receiver, thereby producing a
distinguishable waveform pattern from other waveform patterns
produced by other communication systems; and

modulating the data symbol in which said reference symbol is
inserted with radio frequency signals.

--8. (Previously Presented) The data modulation method
according to claim 7, wherein said step of modulating the data
symbol comprises conducting the modulation according to an
orthogonal frequency division multiplexing (OFDM) system.

--9. (Currently Amended) A data modulation device comprising:
encoding means for encoding transmission data ~~in~~ into a data
symbol;

reference symbol insertion means for inserting into said data
symbol a reference symbol in which multiple synchronizing patterns
are aligned in a time series in order to contain a structure of

IA-A-IA-A-A-IA-A-IA-IA

(where, A is a synchronizing pattern and IA is a phase-shifted synchronizing pattern obtained by phase shifting A) ~~into said data symbol~~, said reference symbol producing a ~~two peak~~ waveform output having only two peaks when said reference symbol is input to a correlator of a receiver, thereby producing a distinguishable waveform pattern from other waveform patterns produced by other communication systems; and

modulation means for modulating the data symbol in which said reference symbol is inserted with a wireless frequency signal.

--10. (Currently Amended) A data modulation device comprising:

encoding means for encoding transmission data ~~in~~ into a data symbol;

reference symbol insertion means for inserting into said data symbol a reference symbol in which multiple synchronizing patterns are aligned in a time series in order to contain a structure of

IB-IB-IB-IB-B-B-B-B-IB

(where, B is a synchronizing pattern and IB is a ~~phase shifted~~ phase-shifted synchronizing pattern obtained by phase shifting B) ~~into said data symbol~~, said reference symbol producing a two peak waveform output having only two peaks when said reference symbol is input to a correlator of a receiver, thereby producing a distinguishable waveform pattern from other waveform patterns

produced by other communication systems; and

modulation means for modulating the data symbol in which said reference symbol is inserted.

--11. (Currently Amended) A communication device comprising:
encoding means for encoding transmission data ~~in~~ into a data symbol;

reference symbol insertion means for inserting into said data symbol a reference symbol in which multiple synchronizing patterns are aligned in time series in order to contain the structure of

IA-A-IA-A-A-IA-A-IA-IA

(where, A is a synchronizing pattern and ~~IA is a phase shifted~~
~~syne phase-shifted synchronizing pattern obtained by phase shifting~~
~~A) into said data symbol~~, said reference symbol producing a ~~two~~
~~peak~~ waveform output having only two peaks when said reference symbol is input to a correlator of a receiver, thereby producing a distinguishable waveform pattern from other waveform patterns produced by other communication systems;

modulation means for modulating the data symbol in which said reference symbol is inserted with a radio frequency signal;

an antenna for receiving/transmitting a modulated signal; and

synchronization detection means for obtaining a correlation value between the reference symbol of the modulated signal received and a delayed reference symbol and detecting a synchronization.

--12. (Currently Amended) A communication device comprising:
encoding means for encoding transmission data ~~in~~ into a data symbol;

reference symbol insertion means for inserting into said data symbol a reference symbol in which multiple sync patterns are aligned in a time series in order to include a structure of

IB-IB-IB-IB-B-B-B-B-IB

(where, B is a synchronizing pattern and IB is a ~~phase-shifted~~ syne phase-shifted synchronizing pattern obtained by phase shifting B) ~~into said data symbol~~, said reference symbol producing a ~~two~~ peak waveform output having only two peaks when said reference symbol is input to a correlator of a receiver, thereby producing a distinguishable waveform pattern from other waveform patterns produced by other communication systems;

modulation means for modulating the data symbol in which said reference symbol is inserted with a radio frequency signal;

an antenna for receiving/transmitting a modulated signal; and

synchronization detection means for obtaining a correlation value between the reference symbol of a modulated signal received and a reference symbol delayed and detecting synchronization.